

Statewide Summary for Mississippi

By Cynthia A. Moncreiff¹

Background

Although the coastline of Mississippi spans only 113 linear kilometers (70 mi), the estuaries within its borders constitute a much larger area, roughly 594 km (369 mi) (fig. 1). The primary body of water within the State's boundaries that supports seagrasses is Mississippi Sound, which covers 175,412 ha (433,443 acres) at mean low tide (Christmas, 1973). This body of water is immediately bounded by the coast of Mississippi to the north; Mobile Bay, Ala., to the east; a series of barrier islands that make up most of the Gulf Islands National Seashore to the south; and Lake Borgne, La., to the west (fig. 1).

Mississippi Sound is fed from the north by eight coastal mainland watersheds and drainage systems and from the south by tidal exchange with the Gulf of Mexico (through a series of five barrier island-bounded passes). From west to east, the mainland drainages include Lake Borgne (La.), the Pearl River (La. and Miss.), the Jourdan River (Miss., part of the St. Louis Bay complex), the Wolf River (Miss., part of the St. Louis Bay complex), the Tchoutacabouffa River (Miss., part of Biloxi Bay), the Pascagoula River (Miss., one of the only remaining undammed river systems in the continental United States), and Mobile Bay (Ala.). These systems have been combined into three estuarine drainage areas by the National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service Special Projects Office: the western portion of the Mississippi Sound, the eastern Mississippi Sound, and Mobile Bay, Ala. (National Oceanic and Atmospheric Administration, 2003). The western portion of Mississippi Sound receives an average of 455.8 m³/s (15,741 ft³/s) of fresh water from a coastal watershed of 948,976 ha (3,664 mi²) and a total watershed area of 2,726,493 ha (10,527 mi²). Eastern Mississippi Sound drains a coastal area totaling 463,351 ha (1,789 mi²) and a total watershed area of 2,500,645 ha (9,655 mi²), with an average freshwater inflow of 426.6 m³/s (15,065 ft³/s). Waters from Mobile Bay, Ala., which receives an average of 1957.4 m³/s (69,118 ft³/s), also flow into Mississippi Sound; the watershed of the bay totals 11,441,843 ha (44,177 mi²); 1,150,737 ha (4,443 mi²) of this region is encompassed in the coastal watershed National Oceanic and Atmospheric Administration, 2003). Based on

this information, total discharge of fresh water into Mississippi Sound averages 882.4 m³/s (30,806 ft³/s), excluding inflow from Mobile Bay, Ala.

Areas that support seagrasses within Mississippi's coastal waters include the Gulf Islands National Seashore (GINS), specifically Ship, Horn, and Petit Bois Islands, and Cat Island, which was partially purchased as an addition to the GINS. Two additional areas along the immediate coast, one at the margins of the Grand Bay National Estuarine Research Reserve at the eastern boundary of the State and the other at the western edge adjacent to Buccaneer State Park, complete the list of estuarine and marine areas within the State that support seagrasses. All of these areas fall within the boundaries of a single water body, the Mississippi Sound.

Statewide Status and Trends

Recent estimates of seagrass coverage based on 1992 aerial imagery (NBS, 1992; Moncreiff and others, 1998) indicate that only 3% of the bottom of the Mississippi Sound supports seagrass, with a total of 809 ha (1,999 acres) of seagrass, despite the sound having an average depth of 2 m (6 ft) and approximately 6,000 ha (14,826 acres) that is believed to be capable of supporting seagrasses. This 1992 estimate of seagrass coverage represents a substantial loss in cover when compared to previous 1969 estimates of 5,254 ha (12,983 acres) of seagrasses.

Causes of Change Statewide

The primary vector for the continued disappearance of seagrasses is thought to be an overall decline in water quality. The primary vector for the historical disappearance of seagrasses is thought to be a combination of physical disturbances associated with tropical weather systems, depressed local salinities associated with flood events, and an overall decline in water quality, which may have a deleterious effect on certain species of seagrasses.

¹Botanical Consulting and Analyses, Ocean Springs, Miss.

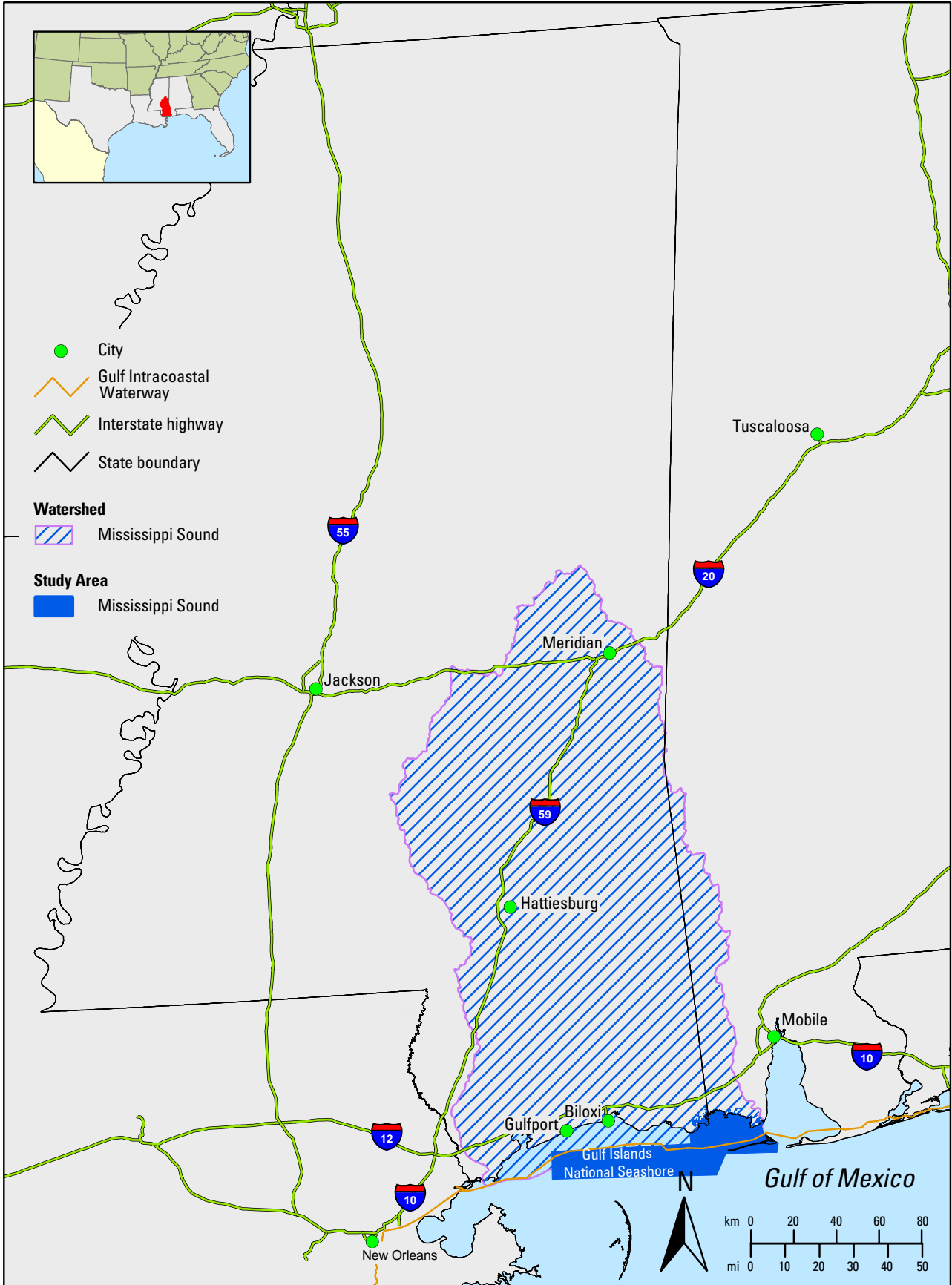


Figure 1. Watershed for the State of Mississippi.

Gaps in Data Coverage

Regions within the State that lack detailed seagrass data where we believe seagrasses to exist are primarily within mainland coastal bayous that contain ephemeral beds of wigeon grass (*Ruppia maritima*) and the documented and extensive beds of wigeon grass that occur along the coastline in Hancock County at the western edge of the State. These beds have been observed to die back during summer and fall, exhibiting bimodal peaks in density in the late spring and in early winter. As a result, they may not have been detected during the selected index period for mapping.

Information on seagrass distribution in the coastal waters of Mississippi is limited. Seagrass was first mapped in 1967–69 as a component of the Cooperative Gulf of Mexico Estuarine Inventory and Study (Eleuterius, 1973); no estimates or measures of seagrass density were made, and the original data were destroyed by Hurricane Camille in August of 1969. Our most recent historical maps of seagrass beds and potential seagrass habitat (Moncreiff and others, 1998) are based on 1992 aerial imagery and maps prepared by the National Biological Service, now the U.S. Geological Survey (USGS) National Wetlands Research Center (NWRC). Aerial photographs taken in 1999 for the Gulf Islands National Seashore are in the process of being photointerpreted by contractors and NWRC.

Differences in the types and classes of seagrass cover reported by Eleuterius (1973) and in the information provided by the NWRC precludes any direct comparisons or estimates of change outside of the loss of species and changes in seagrass acreage. Future mapping efforts at more frequent intervals to address the issue of the development of synoptic datasets and the use of a similar classification system for each mapping effort to produce comparable data for monitoring of seagrass change is needed.

Overview of Seagrass Restoration Efforts

Activities initiated to address seagrass loss include a Federal ban on trawling within a 1.6 km (1 mi) distance of the shoreline of the GINS. Along the mainland, sand beach restoration, erosion control, and creation is limited to areas that do not support seagrasses. In addition, beach maintenance and creation is prohibited in areas that are within 0.8 km (0.5 mi) of existing seagrass beds. Mississippi's comprehensive coastal management plan complies with Federal regulations regarding seagrasses and seagrass habitat.

A community-based pilot seagrass restoration project, funded by the Gulf Restoration Network, is planned for the near future within the boundaries of the GINS. Viable turtlegrass (*Thalassia testudinum*) plants will be collected following any major storm events from wrack lines in the Perdido Key area of northwest Florida and then replanted along the north shore of Horn Island in the vicinity where turtle grass was last documented to have occurred in coastal Mississippi waters.

Overview of Monitoring, Restoration, and Enhancement Opportunities

Programs that target the monitoring, restoration, and enhancement of seagrasses within the State are currently limited to grant-supported efforts. Mitigation associated with the development of coastal areas for use by the casino industry may provide a venue for other means of restoring or enhancing seagrasses and seagrass habitat.



The Mississippi Department of Marine Resources is also charged with seagrass mapping and monitoring as one of its responsibilities. Future mapping may well be undertaken by this agency as a component of its marine resource monitoring and geographic information system based mapping efforts.

References Cited

- Christmas, J.Y., 1973, The estuarine basin: general description, *in* Christmas, J. Y., ed., Cooperative Gulf of Mexico Estuarine Inventory and Study, Mississippi, Phase I: Area Description: State of Mississippi, Gulf Coast Research Laboratory, Ocean Springs, Miss., p. 9–26.
- Eleuterius, L.N., 1973, The distribution of certain submerged plants in Mississippi Sound and adjacent waters, *in* Christmas, J.Y., ed., Cooperative Gulf of Mexico Estuarine Inventory and Study, Mississippi, Phase IV: Biology: State of Mississippi, Gulf Coast Research Laboratory, Ocean Springs, Miss., p. 191–197.
- Moncreiff, C.A., Randall, T.A., and Caldwell, J.D., 1998, Mapping of Seagrass Resources in Mississippi Sound final report: Biloxi, Mississippi, Department of Marine Resources, Gulf Coast Research Laboratory Project Number BY3-156-3238, 50 p.
- National Biological Service, 1992, National Wetlands Research Center Draft Maps - Isle au Pitre, LA–MS, Cat Island, MS–LA, Ship Island, Dog Keys Pass, MS, Horn Island West, MS, Horn Island East, MS, Petit Bois Island, MS, Grand Bay SW, MS–AL, Kreole, MS–AL: Scale 1:24,000.
- National Oceanic and Atmospheric Administration (NOAA) 2003, Bathymetry Image Gallery. Mobile Bay (G150), East Mississippi Sound (G160), West Mississippi Sound (G170): NOAA National Ocean Service, Special Projects Office, available at http://spo.nos.noaa.gov/projects/cads/image_gallery.html, March 6, 2003.